FRD ACTIVITIES REPORT
July - September 2014

RESEARCH PROGRAMS

Project Sagebrush

An initial draft of the comprehensive data report for Phase 1 of Project Sagebrush (henceforth designated PSB1) was completed. It is presently in the process of being reformatted and undergoing internal review. The report will provide a detailed description covering all aspects of experimental design, instrumentation, measurements, quality control procedures, and the final database for the project. Washington State University (WSU) provided key data from their four flux stations on the Grid 3 tower for the month of October covering the time period of the tracer experiments which allowed us to proceed with completion of the data report draft. Receipt of the complete WSU datasets for all of October is still pending.

A manuscript for journal publication tentatively titled 'Revisiting the value of the horizontal plume spread parameter σ_y' has been drafted that covers some of the key findings of PSB1. It is presently in internal FRD review. Tentatively, it is anticipated that it might be paired with a companion paper that addresses some of the questions regarding the magnitudes of σ_y and σ_θ raised in the first paper. The magnitudes of the plume dispersion parameters σ_y and σ_θ observed in PSB1 were unexpectedly large compared to decades old studies that have provided the basis for much of accepted dispersion science. This complementary analysis would focus on possible site differences that could be contributing to the observed differences.

Measurements continue on the Grid 3 tall tower in collaboration with WSU. These were begun as part of Project Sagebrush in late September and will continue until at least late October. A decision will be made at that time to either continue the measurements until next spring or remove the WSU instruments at that time depending on the anticipated needs and schedules of both FRD and WSU. The combination of measurements provided by WSU and FRD will provide a very detailed look at the vertical profiles of turbulence over a broad range of conditions. Bruce Hicks has been provided with data collected by FRD from September through June and the WSU data from October. He is presently utilizing these data sets to assist him with his lines of research. Receipt of the remaining WSU data is pending. (Dennis.Finn@noaa.gov, Rick Eckman and staff)

In preparation for the next Project Sagebrush field deployment, additional sampler cartridges are being refurbished by replacing the tubing and sealing the sampling bag to tubing connection. This quarter, FRD completed the refurbishment of 278 sampler cartridges making a total of 840 cartridges available. This allows five complete sampling periods using all available samplers to be completed before cartridges must be re-used. (Roger.Carter@noaa.gov , Donna, Jason, Shane, Tom, Brad)

An abstract entitled "Changes in Horizontal Plume Distributions at Larger Turbulence Intensities" was accepted for oral presentation at the 2015 American Meteorological Society Annual Meeting in Phoenix,

Arizona. It describes some unexpected results obtained from the Project Sagebrush tracer studiy in periods with high turbulence intensities. (Richard.Eckman@noaa.gov, Dennis Finn, Kirk Clawson)

Birch Creek Valley Wind Flow Study

The draft manuscript "Diurnal Late Spring and Summertime Wind Patterns on the Snake River Plain and the Influence of Complex Terrain Factors" was submitted for publication in the Journal of Applied Meteorology and Climatology. It is currently in review there. It summarizes results from the first phase of the Birch Creek Valley measurements. Follow up work on a second phase of analysis has begun but further progress is stalled pending availability of data from the U.S. Forest Service Fire Sciences Laboratory. (Dennis.Finn@noaa.gov)

ARL Convective Initiation Project

As noted in the 2014 third quarter report, ARL decided to re-advertise the postdoctoral associate position that will be assisting with numerical modeling for the convective-initiation project. Eleven candidates applied to the new announcement. The top three candidates were contacted in July, with two of them still interested in an interview. Early in August, Dr. Shuyan Liu was selected for the position. She will be starting work at FRD on 1 October. Previously, Dr. Liu worked at ARL Headquarters while employed by the University of Maryland's Earth System Science Interdisciplinary Center (ESSIC). She will continue to be employed by ESSIC for the two-year duration of the new position.

FRD continued to support the project's field study near Huntsville, Alabama by archiving output from the High Resolution Rapid Refresh model. Only a subset of the model's output over Alabama is being archived, but the hourly runs still add up to over 1 GB of storage per day. (Rick.Eckman@noaa.gov ; Tilden Meyers and Bruce Baker, ATDD)

Wind Forecast Improvement Project (WFIP)

During the quarter, FRD finally received NOAA funding for the project. The first step was to purchase equipment both to upgrade the existing flux measurement station at the Idaho National Laboratory (INL) and to deploy a new flux station in the wind farms to the east of Idaho Falls. Since the wind farms are in complex terrain, the INL station will provide reference measurements in flatter terrain that is part of the Snake River Plain. In addition to the flux station, FRD will also be deploying a sodar and 915 MHz wind profiler near the wind farms. Because of the funding delays, the equipment will not be installed until the first quarter of fiscal year 2015. (Kirk.Clawson@noaa.gov, Rick Eckman)

HYRad

A major section of HYRad was rewritten to replace the Google Maps api with a Flash based api from Map Quest. This was necessitated by the deprecation of the Goolge Maps Flash api. In addition to replacing the mapping api, several user-requested features were added to the HYRad interface. The popup menu, displayed when right-clicking the map, has been replaced by a map menu button. Additions to the menu include the capability to display major INL roads and facilities. A source icon for the release location has been added to the map. This icon can be removed or redisplayed by toggling the corresponding menu item. Saving and printing the map has been modified to present the entire interface rather than only the map. Slider bars, for increasing the font size of the legend and annotation text, have been added to the interface. This makes both legend and annotation text more readable when printing and saving model output. (Brad.Reese@noaa.gov)

Big Southern Butte

Final reviewer comments were received on the manuscript submitted for publication in Atmospheric Chemistry and Physics:

Butler, B. W., Wagenbrenner, N. S., Forthofer, J. M., Lamb, B. K., Shannon, K. S., Finn, D., Eckman, R. M., Clawson, K., Bradshaw, L., Sopko, P., Beard, S., Jimenez, D., Wold, C., and Vosburgh, M.: High resolution observations of the near-surface wind field over an isolated mountain and in a steep river canyon, Atmos. Chem. Phys. Discuss., 14, 16821-16863, doi:10.5194/acpd-14-16821-2014, 2014. (Dennis.Finn@noaa.gov)

Responses to reviewer comments were subsequently submitted by the lead authors. Final disposition of the paper is pending the decision of the editor.

NOAA/IDAHO NATIONAL LABORATORY (INL) METEOROLOGICAL RESEARCH PARTNERSHIP

NOAA/INL Mesonet

Operation and maintenance of the INL mesonet is always a significant activity at FRD. This quarter, a telephone line connection to the Grid 3 tower on the INL was completed and brought on line. This allows collection of critical Grid 3 data to continue if the radio network goes down. A number of changes are being made to the mesonet database to accommodate new instruments and documentation for the INL Mesonet Data System has been updated. (Roger.Carter@noaa.gov, Shane, Tom, Brad)

In January 2014, FRD purchased a new radio frequency modem, the RF500M, from Campbell Scientific to replace one of the discontinued RF310M modems. Unfortunately, the RF500M did not work properly in the radio network used to collect data from the NOAA/INL mesonet weather stations. When Campbell Scientific was contacted for help in resolving the problem, they did not accept the explanation that the RF500M was malfunctioning, but preferred to blame the radios or the power supply and they required more testing. After completing nine separate tests on nine different days and providing complete documentation on our radios and power supplies (including pictures), Campbell Scientific identified a firmware bug as the problem on September 16, 2014. Unfortunately, they have not sent a fix for the problem yet. (Roger.Carter@noaa.gov , Shane Beard, Tom Strong)

The mesonet station at Richfield was switched from solar power to line power during the reporting quarter. The cost was paid for by the U.S Bureau of Reclamation Agrimet Program. They are a measurement partner at several other mesonet stations. Line power was needed to provide enough electricity for a heated rain gauge. The solar power capability that was removed from Richfield will be installed at an existing solar mesonet station such as Rover. The additional solar power will provide sufficient power to provide for aspirated air temperatures which are more accurate than the naturally aspirated air temperatures that are currently recorded at all other solar stations.

Emergency Operations Center (EOC)

At the request of the INL emergency response organization, a set of preplanned or canned weather data was generated for the INL emergency response drill on September 17, 2104. While testing the data set just before the drill began, a problem was discovered in the HYRad system which could potentially interfere with the operation of HYRad using the preplanned weather data. The problem was corrected

before the drill began and the system worked without a problem during the drill. Afterwards, a number of corrections were made to the system which will prevent the problem in the future. Thus, the drill provided an opportunity for FRD to improve the HyRad system as well as allowing the emergency operation organization to meet their requirements. (Roger.Carter@noaa.gov , Brad, Dennis, Rick)

The Emergency Operations Center held the INL Annual Exercise on 1 August. The drill centered on a fire and security event at the Materials and Fuels Complex. Team A participated and issued Nowcasts and short term forecasts during the drill.

Team C participated in a drill held at the Emergency Operations Center on 6 August. The drill was centered on a bus accident at the underpass ("puzzle") near CFA. A plume plot assuming methane for Liquid Natural Gas from the bus accident was produced using the Aloha chemical dispersion model. Nowcast and short term forecasts were also issued during the drill.

Team A participated in a CWI drill held at the Emergency Operations Center on 20 August. The drill was centered on a radiological transportation accident. Nowcasts and short term forecasts were issued during the drill. Numerous plume plots were created using HyRAD that helped in the evacuation of personnel.

Team B participated in a beyond design basis drill at the Emergency Operations Center on 17 September. This drill was the dress rehearsal for an upcoming evaluated drill scheduled to occur in October. The scenario for the drill was a major earthquake that affected nearly all onsite facilities. Multiple plume plots from HyRad were produced on two separate computers for multiple release locations in close coordination with INL assessment specialists. Nowcasts and short term forecasts were also provided.

INL Dispersion Modeling

FRD was contacted by a group affiliated with both the Idaho National Laboratory and Idaho State University regarding upgrades to a probabilistic risk assessment system that the group has developed for the Nuclear Regulatory Commission. The system provides risk assessments for possible failures at nuclear power plants. One of the upgrades under consideration is to add a dispersion model, which would allow the system to provide probabilistic estimates of radiological doses. The group is interested in using the ARL HYSPLIT model for these dose estimates. After consulting with ARL Headquarters, FRD provided the Idaho group with the HYSPLIT source code and gave them advice on configuring and running the model. The addition of a dispersion component to the risk assessment system is currently in a proof-of-concept stage. Specific issues, such as how the assessment system will provide meteorological input to HYSPLIT on a routine basis, have not yet been addressed. (Richard.Eckman@noaa.gov, Brad Reese, Dennis Finn)

INL Hazardous Weather Alert System

An active weather pattern set up across Idaho this past quarter that made the need to issue 11 specific INL hazardous weather alerts. Eight of the alerts were issued for due to lightning and 3 alerts were issued for high winds.

OTHER ACTIVITIES

Safety

The list of hazardous materials at FRD required by the OSHA Hazard Communication Standard has been updated and made available to all employees. We are in the process of updating the Safety Data Sheet for each of the materials on the list. (Roger.Carter@noaa.gov , Donna)

During the July staff meeting, informational sheets on "Radon in Your Home" were distributed to the employees.

At the August staff meeting, employees viewed a video on lockout-tag out procedures by Master Lock Safety Solutions.

In September, employees participated in Workplace Safety Survivor Game and Workplace Safety Charades after the regular staff meeting.

Computer IP address change

FRD's network addresses, provided by the INL, were reclaimed by INL's Internet Service Provider. This required that a new set of IP addresses be assigned to FRD, which subsequently required changing all software using IP addresses for network access, from web applications to data collection. Most changes were made in a timely manner, but some required more extensive program changes. All changes have been completed and everything is working as before the change. (Brad.Reese@noaa.gov, Roger.Carter@noaa.gov)

Travel

Donna Davis traveled to Las Vegas to attend pre-retirement training, July 15-18.

Outreach

September 18, Shane Beard and Roger Carter gave a presentation at the "Brew with the Crew" seminar series co-sponsored by INL, ICIS, ISA, and IEEE.

Jason Rich gave a Weather Safety presentation to a group of Boy Scouts on July 8.

Training

Donna Davis participated in a "Women's Leadership: Competence and Confidence" Worklife Webinar on August 6.

On September 30 Mark Cerchione with the Federal Protective Service provided Active Shooter and Identify Theft training to the staff at FRD.

All federal employees and contractors completed the required annual training in September; 2014 NOAA Employee Safety and Environmental Awareness Course and NOAA Information Technology Security Awareness.

Misc.

Brad Reese received his 25 year Service Award on August 14.